Pacific Coastal & Marine Science Center

Geotechnical Properties of Effluent-Affected Sediment, Palos Verdes Margin, Southern California (abstract from talk): EOS Trans. AGU, 76(3), Ocean Sciences Meeting Supplement OS1, 1996.

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Geotechnical properties of sewer effluent-affected sediment help characterize and map the deposits and to predict the stability of these deposits under gravitational and seismic loading. The physical and geotechnical properties of the effluent-affected sediment layer (EASL) mantling the Palos Verdes margin of Los Angeles County, California were determined using non-destructive whole-core logging techniques and conventional geotechnical strength and consolidation tests. We cataloged our results within a geographic information system (GIS) framework that included measurements of sediment bulk density, compression wave velocity, magnetic susceptibility, and vane shear strength. The GIS approach allowed us to evaluate the spatial variability of the measured properties, and their influence on processes effecting the EASL.

On the shelf, our measurements of EASL thickness indicate two depocenters of effluent-affected sediment: one center immediately northwest of the LACSD diffuser pipe array, and a second center offshore Portuguese Bend. The first depocenter is composed largely of effluent emanating from the diffuser array. The second depocenter is the result of mixing of the LACSD effluent discharge and debris eroded from the toe of the Portuguese Bend Landslide. This mixing results in a localized enlargement of the EASL with diminished contaminant levels, probably the result of dilution by the Portuguese Bend debris. We found the EASL as it presently resides on the shelf to be stable under gravitational and earthquake loading, but that the slope may be sufficiently steep in areas to trigger localized failure during earthquakes. We also found that high levels of total organic carbon, which is often associated with high levels of p,p'-DDE contamination, were associated with low density and low shear strength zones in the EASL.